# THE AUSTRALASIAN SCIENTIFIC MAGAZINE.

No. I. AUGUST 1, 1885. Vol. I.

## OURSELVES.

BY

THE EDITOR.

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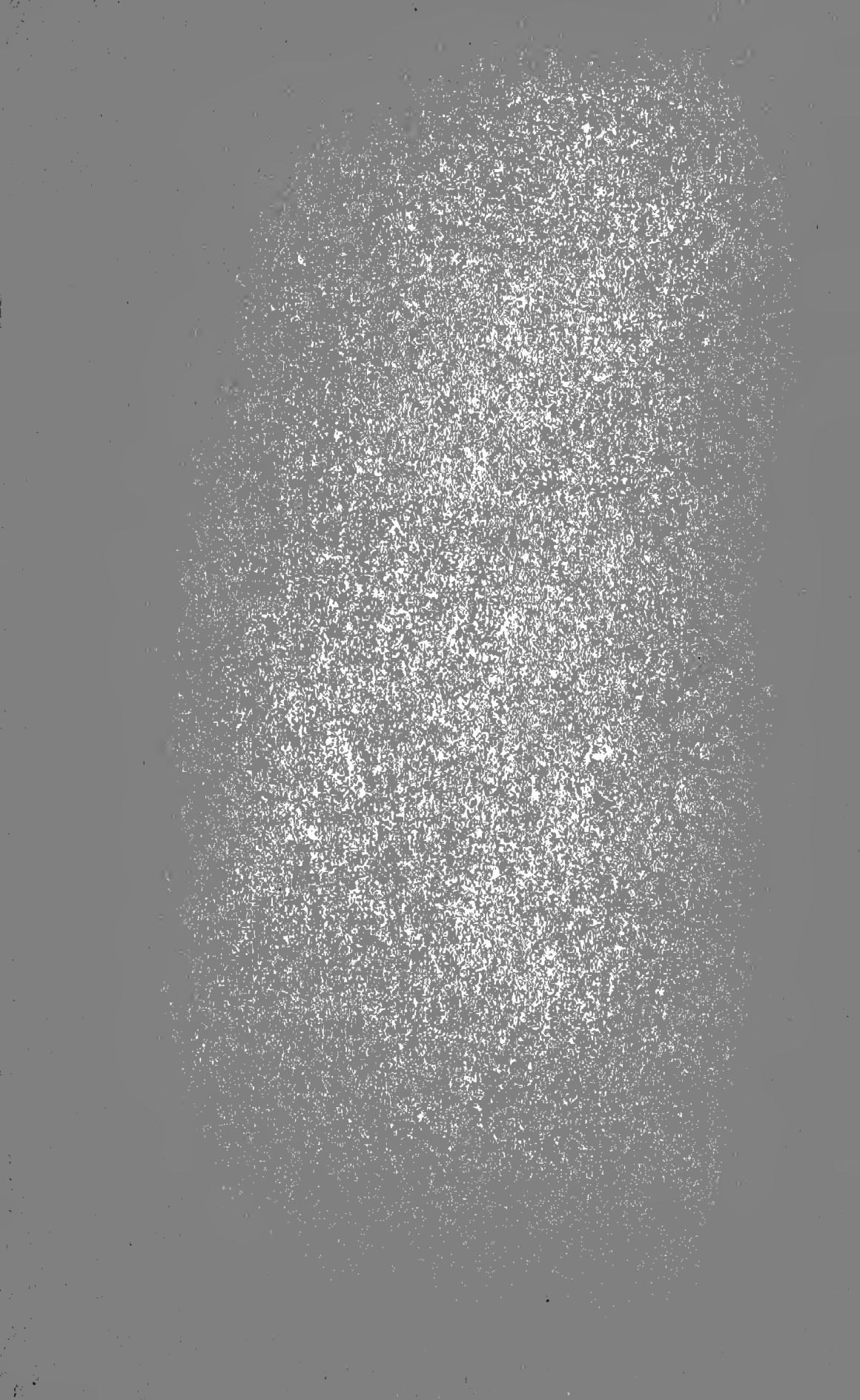

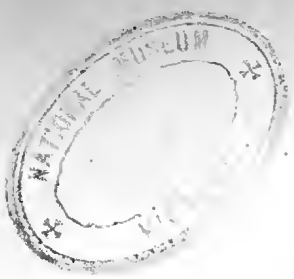

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# AUSTRALASIAN SCIENTIFIC MAGAZINE.

No. I. AUGUST 1, 1885. VOL. I.

## OURSELVES.

BY

THE EDITOR.

CONSIDERING how many men of learning there are in Australasia, and even in its separate parts, it is somewhat surprising that there is so little bond of union amongst them. The members of a Society are presumed to know one another after the ceremony of admission; but how often is that only a presumption? and how often is it found to extend to the members of other Societies? Except in individual cases, a whole class of enquirers upon certain subjects know nothing of enquirers upon kindred subjects, but what they may know from their writings; and objects of common interest, when promoted at all, are left to individual effort, or to chance or accident. With such a magazine as the *Australasian Scientific*, which can be readily obtained, there is no doubt but that the laudable enterprise of the proprietors, in publishing such a work, will be promptly and cheerfully responded to, and we hope that our undertaking will be speedily and successfully accomplished. When we consider how tardily public measures progress for the benefit of literature and science, how little has ever been done or thought of on such subjects, how hard it is to convince the public of the necessity, how ill understood and practised, both in public and private, are even the common subjects of classification and record, we must admit that things are not as they ought to be. The appearance of this Magazine is the first step in the right direction, and the support of the public will be the second.

At present a member of any Society has no opportunity of informing himself respecting the general progress of other Societies, except through their transactions. But their proceedings he does not see at all; and the incidental

notices of a few Societies which appear in the newspapers occasionally, seem to show what good work may be done, if our Magazine is successful. It is sometimes quite impossible for gentlemen to see the transactions of particular Societies at all, or even for a member of some particular Society to complete his own set; or the volume which was in course of production when he was elected. And even from such opportunities of keeping pace with the progress of knowledge as town members possess, country residents are debarred. Some of them cannot procure their reports of the transactions until six or twelve months after the time of issue, and for causes which are perfectly remediable, the trouble of procuring them at all, destroys half their value.

All these and many similar evils will be now cleared away by the establishment of this periodical, which will be devoted exclusively to the learned societies. It will be issued monthly, and each number will contain a portrait and short biographical sketch of some well-known gentleman of science in Australasia, and will be distributed, as may be most convenient, either through our publishers, or persons appointed in connection with the different societies as secretaries. The proceedings of some of the more important societies will be published in full, and so will contain a faithful narrative of every occurrence of interest, while occasionally a short abstract of any important paper will appear. The establishment of this magazine will afford an opening to young societies for the publication of the more important papers read before them, and so assist them in their earlier stage of activity. It will be necessary, however, for their respective secretaries to draw up and furnish each account as regularly and as carefully as possible, as the value of the whole would be greatly lessened through occasional interruption. It is easy to see what good effects will flow at once from such an arrangement. The separate numbers will contain from year to year the elements of the history of all important societies. We will record every election, whether of members, council, or officers; every removal, by death or otherwise, any presentation; the title, and occasionally the substance, of every paper read; any important alteration in the laws of any and the statistics of the various societies. Our magazine, too, will be the best medium for remarks and enquiries respecting the various societies and their labours; for occasional essays and correspondence on topics of common interest, and for reviews of all works of science issued. There is no doubt that this magazine may fail to reach many who are connected with various societies, but it is equally certain that it will be regularly read by many other literary and scientific men who are not so connected; and it is probable that an interest will be thus awakened in the minds of the latter, which will induce to seek for a complete participation in the benefits which some of the societies bestow. Our magazine will be, at all events, an important step taken to promote the union and harmonious working of the societies; without the slightest interference with each other, or possible injury to them. Many an unknown and unfriended inquirer in remote districts will be cheered and encouraged; and not a few societies that barely exist, will be nourished into life and activity. We, therefore, in closing our remarks, hope that the Australasian scientific public will appreciate us on our own merits, and give us the benefit of their support in meeting a long-felt want.

# EXTINCT ANIMALS

BY

T. S. BULMER, M.D., Etc.

I shall not consider the earth as a dead animal, vegetation or trees as the hair on its back, the mountains as its back-bone, the rivers as blood-vessels, the mighty ocean as its heart, the minerals as the marrow of its bones, earthquakes as a feverish excitement of its system, or volcanoes as the bilious eructations of a disordered stomach ; nor even will I consider ourselves as the barnacles attached to a large whale; but rather as constituents of the churchyard of nature, which contains, in stratified order, the remains of all our brother animals, which have made their exit for the last 500 million years.

Let us now descend into the bowels of the earth, examine its shelves, what do we see? Coffins and bodies placed in identical position, according to the age and period in which they expired. There before our visual orb will be seen our brother animals of the fifth epoch, not akin to any of the present era, nor yet can we trace any kith or kinship with them except as regards their skeleton forms.

We further view their death-beds, and find no disturbance of their funeral shrouds, but rather regularly arranged earthly coverlets with all the older scions, superimposed above each other, as if their lineage and rank were to be examined into at some future aions of time.

Taking a section of a few hundred feet of the burial ground, at various heights, you will find one class of animals, Ammonites for instance, all disposed in their particular zone, or belt of limestone or clay. Viewing the question, we cannot but ask, have all these forms, though in broken stages and with some irregularities and erring advance, been subject to any continuous law of growth or change ?

If our education had been purely scientific, and entirely free from other hindrances and delusions, acting as foreign bodies in the domains of science, we should never have allowed the anthromorphism of false error to have crept in, and regard the various strata as a series of carpenters' benches for the manufacture and renewing of new species, out of all relation to the old material, or, in other words, working out the old man with new propensities.

Animals have existed of which no traces are now found, there must then have been a second creation ; or transformation has gone on.

If Noah, in his ark, had species of all kinds with him, and they are the ancestors of all our present race of animals, what about the extinct classes which never coincide, though of the same family, with our present race of animals ?

If an objection is raised to transmutation, that from the carboniferous epoch scorpions have not changed, I say that as each creature was peculiarly adapted to that situation destined to be occupied by it, then the conditions being favourable the species remained; if conditions became unfavourable the species was lost.

If we should allow the *Argali* to be the parent of our sheep, and, consequently, admit that the differences are explicable by degeneration, no difficulty can any longer exist about the unity of the human race. The *Argali (ovis ammon)* was a large animal, fleet as a stag, armed with horns and thick hoofs, and covered with long coarse hair. It resisted the wolf, and jumped frightful precipices. A horn of it weighs nine pounds, and can be seen in Gottingen museum.

The species of animals of one period lived only in that period. The same species is never found in two strata of a given period.

Taking, as Richardson states, the faunas of the oldest strata, as composed of the simplest organized elements, their degree of perfection will increase in proportion as we approach epochs more recent.

Lyell, when speaking of the great changes continually going on, said—"That the movements of the inorganic world is obvious and palpable, and might be likened to the minute-hand of a clock, the progress of which can be seen and heard;" but when referring to the evolutionary changes in animals, remarks, "whereas the fluctuations of the living creature are nearly invisible, and resemble the motion of the hour-hand of a time-piece, it is only by watching it attentively for some time, and comparing its relative position after an interval, that we can prove the reality of its motion."

Now, if we enter into the study of Morphology, evolution will be seen to proceed in regular grades, thus animals become advanced and changed by almost imperceptible gradations, until the adult type is attained in a certain number of days or years.

Although this evolution is going on daily within our experience, yet many persons cannot conceive that the same process of evolution can have taken place in past ages, so as to produce from such minute beginnings, all the varied fauna of our globe.

The natural forces which in a few days develop a chick out of a little protoplasm and three or four teaspoonsful of yolk, are pronounced incompetent to originate slowly, but surely, a gradually developing series of creatures under changed conditions of life, and I may say a counterpart of ourselves and co-partners on this earth.

To my mind the one is as great a wonder as the other, in fact, both are different phases of one history of organised life.

Mohammed believed in a progressive evolution, for, to quote the Koran, he says, "It needs not that I swear by the sunset redness, and by the night and its gatherings, and by the moon when at her full, that from state to state ye shall surely be carried forward." (Koran, Cap. lxxxii).

Referring to Geology, which treats of the earth's strata, I may say that if it is in the least to be relied on, any moderately educated person will see that the world was not made backwards, but originated by slow metamorphoses; he will also infer that, at a definite epoch of refrigeration, life was evolved in a natural manner, and that during this transformation of the crust of the globe, creatures were gradually increasing, differentiating, and establishing themselves.

Professor Seely (Galignani, 1877) asserts that "extinct types of life exist which go far to bridge over the gap in organization in different groups, as

between reptile and bird, and to show that animals may acquire development characters of a higher group."

Bishop Butler says that "We are placed in the middle of a scheme—not a fixed, but a progressive one—everyway incomprehensible—incomprehensible in a measure equally with respect to what has been, what now is, and what shall be hereafter."

"There are traces," says Professor Sedgwick, "in the old deposits of the earth of an organic progress amongst the successive forms of life;" whilst Owen saw the connection of descent from the Ichthyosaurus to Man, he deems the influence of circumstances to be decisive; and yet he says, "I deem an innate tendency to deviate from the parental type, operating through periods of adequate duration, to be the most probable natural way of the secondary law, whereby species have been derived one from the other." Referring to Lamarck, I read, "Nature exhibits living beings, merely as individuals, succeeding one another in generations, species having only a relative stability, immutable."

The metamorphoses which are going on in the vegetable, as distinguished from animal metamorphoses, are only by an addition of new parts to the old ones. In animals, however, the whole body is transformed in such a manner that all the existing, or component parts, contribute to the formation of the modified body.

The nature, the duration, and the importance of metamorphoses, and also the epoch at which they take place, are infinitely varied.

By the study of the remains of our brother animals, we are led to perceive there has been a replacing of their forms, some were ephemeral, others more persistent; whilst in all there has been a singular departure from the typical structure of reptiles amongst old forms, when compared with recent or living representatives of the same class.

Professor Murchison (Ann. Address) says "We have been obliged to give up the theory of great breaks between successive formations. We find a gradual passage from one geological formation to another, a gradual dying out of pre-existing forms of life, and the gradual introduction of newer."

We may, however, state that there is every evidence of a continuous operation of Nature's law, from the first embodiment of the vertebrate idea, under its ancient Ichthyc garment, until it assumed the glorious apparel of the upright arboreal savage, when nature broke the die, and left us slaves to circumstances

# A PLEA FOR EARLY SUMMER ROSES.

BY

L. & W.

Why write of summer roses during days of July? it may be asked. Some may think it a subject much more seasonable in December than at mid-winter. But our reply is that this is the season of the year when roses are planted, and it is the purpose of this paper to indicate what is best for planting, or, at least, best for certain purposes. Let us say at the outset that we do not intend to refer to the large class of hybrid perpetuals, but to certain groups of early flowering summer roses, which are too much neglected but which are of great value in the garden. It may be that some of our readers, who find in the hybrid perpetual and Noisette roses all that they can desire, may deem our notions antiquated, but that is no reason why we are constrained to maintain silence. These fine roses are undoubtedly fashionable in these days. But fashion is all very well to a certain extent, and it is not well to make inordinate sacrifices at her shrine. Some musings in a representative garden of roses during the past summer evenings have convinced us that in many rose growers devoting themselves with so much ardour to the cultivation of the late summer and autumnal roses they have suffered themselves to become a little less than just to the tribe of fine old summer-flowering types. Now we have no wish to depreciate in any way the beauty and usefulness of such grand roses as Alfred Colomb, A. K. Williams, Charles Lefebvre, Etienne Levet, Marie Baumann, and others too numerous to mention; but it can be said of the summer roses that where the former yield one flower, the latter furnish a dozen; and coming as they do all together their effect is very fine. Let us glance at the characters of a few of these summer roses. First there are the Provence or Cabbage roses, progeny of *Rosa Centifolia*. The old Provence or Cabbage rose is supposed to have been introduced into England in 1596. All the varieties are perfectly hardy and deliciously fragrant, mostly of moderate or dwarf habit of growth, requiring rich soil and moderate pruning. They thrive best when grown upon their own roots, and a bed of the old Cabbage rose should be in every rose garden. The best varieties, the common Cabbage, rosy pink, large and full; Cristata, or Crested rose, with pale edges, beautiful, large, and full; Striped Unique, white, sometimes beautifully striped with lake, large and full; and the White Provence, pure white, large and full. The De Meaux, or Miniature Provence, or Pompon rose, is an interesting and beautiful type, some of them being moss roses. The following are very useful for edging of rose beds, or for making small beds, all of them producing flowers about two inches across:—Burgundy, deep red, very small and double; White Burgundy, white, very scarce; De Meaux, or Pompon, rosy-lilac, very small and full; Moss de Meaux, deep pink, prettily mossed, very small double flowers; Little Gem, moss, crimson, like the foregoing, but darker, very small and double, a

charming novelty, and Spong, pale rose, small and very double. Then there is a delightful group known as the Striped Provence and Gallica roses. The French Rose, or *Rosa Gallica*, is supposed to have been introduced into England about the sixteenth century, and until the introduction of the perpetual blooming varieties was the favourite rose of our English gardens. The group to which we are desirous of calling attention is composed of old striped roses collected from various sources. Some are Provence, other Gallica roses. We may mention a few of them, viz., Belle des Jardins, reddish carmine, with white stripes; Gloria Mundi, red, striped with white; Mecene, white, striped with rose; Oeillet Parfait (Damask), red, striped with lilac and purple; Perle des Panachees, white, striped with lilac, very beautiful; Village Maid, white, striped with rosy purple; and York and Lancaster, white, striped with red. The moss roses form also a group of delightful forms. They are the progeny of *Rosa centifolia muscosa*. The original or old moss rose is supposed to have been introduced from Holland, but as to its origin no satisfactory account has ever been given. It is, however, generally believed to be a sport from the old Provence. The moss roses are mostly of delicate growth, though some are vigorous and robust in habit, and form good standards; but, as a rule, they succeed best when grown upon low stocks, or otherwise upon their own roots; the latter mode is best suited to the old moss, and no garden wherever roses are grown should be without a bed or two of this old favourite, or some of its varieties. All the Provence and their offspring, the moss roses, are deliciously fragrant, rendering them, irrespective of their beauty and associations, necessary to retain. Close pruning, plenty of manure, and otherwise rich culture, are essential to their successful growth. The common moss has beautiful pale rose flowers; the crested moss is bright rose, very attractive; the White Bath moss is paper white, beautiful and full; then there are Blanche Moreau, very large, pure white, extra fine; Celina, rich crimson, shaded with purple; Gloire des Mousseuses, blush, very large and full, one of the best; Julie de Mersant, rosy pink, very beautiful; and Laneii, rosy crimson, tinted with purple, very good. The hybrids of Chinese, Bourbon, and Noisette roses are among the best of the summer-flowering types, and they are especially adapted for garden decoration, being strong growing, therefore good climbers, and most useful for pillar purposes. The best are Blairii No. 2, blush pink, fine, very large, and double; Charles Lawson, vivid rose, shaded, large, and very double: Coupe d'Hebe, rich deep pink, large, and very double; Fulgens, bright crimson, large and double; Juno, pale rose, very large; Madame Plautier, pure white, free bloomer, beautiful and full; Paul Verdier, light carmine-red, fine, globular form; and Vivid, vivid crimson, a very showy pillar or climbing rose. We have thus passed in review a few groups of the handsome and useful summer roses. We hope we have said enough to draw the attention of our readers to their great value. Now is the time to order and plant. The weather is fine and open, and the sooner planting is done the better in all respects.

# HOLIDAY RAMBLES IN THE AUSTRALIAN ALPS.

BY

JAMES STIRLING, F.L.S., F.G.S.

No more charming or more picturesque area is to be found in the whole extent of the Australian Alps than that occupied by the Devonian marine limestones of Bindi. Situated in the sources of the Tambo, they form an extremely park-like area, its rounded hillocks, the swelling outlines of its undulating richly grassed and lightly timbered ridges, form an agreeable contrast to the more sombre aspect of the bold, thickly wooded mountains, which—amphitheatre-like—surrounds it on all sides. In more than one sense the area is especially interesting to the student of physiographic science. Here is seen in striking contrast the peculiar effect of weathering sub-ariel denudation—both on the limestone rocks and on the schists, porphyries, slates, and conglomerates, by which the former is surrounded, and, as we shall see further on, underlied. Here may be seen the differences in the ratios of denudation to erosion of various rock formations under similar climatic condition; the different kinds of endemic arboreous vegetation, whose variety of foliage and form helps to render the area so charming and park-like. Here also are found the relics of a marine fauna of a bygone age, which lie embedded in limestone rocks, as well as their relation to the adjoining formations. Here also may be found many lovely spots, from whence the holiday-seeking tourist, free from the smoke and dust of our large cities, may, while reclining on the verdant slopes, watch with increasing interest the glories of an Austral sunset, and while thus gazing on charming mountain landscape, behold dame Nature robed in her supremest form of loveliness, as tones and shades of colour blend harmoniously over the distant ranges; and as the evening shadows deepen in the valleys while inhaling the cool, pure mountain air, he can feel that strange but real fascination which a contemplation of the beautiful evolves. 'Tis thus:—

> "The awful shadow of some unseen power,
> Floats tho' unseen among us: visiting
> . . . .
> Each human heart and countenance,
> Like hues and harmonies of evening,
> Like clouds in starlight widely spread
> Like memory of music fled;
> Like angels that for its grace may be
> Dear, and yet dearer for its mystery.

To describe the Physiographic features of this most interesting sub-Alpine region, is the object of the present article. And if any addition to the reader's knowledge of this outlying part of the colony is gained during our holiday rambles, then such rambles will not have been in vain. As fellow students let us wander together over hill and valley, picking up scraps of

information as we journey along. Here, then, in the Tambo Valley, above Tongio, let us examine our surroundings. Are there no objects of interest? Can we not find "A pleasure in the pathless woods?" Yes my friend—even those steep spurs of silurian slate and sandstone may prove to us a lesson; a lesson fraught with interest of the past. Here is a sideling cutting, see how the beds of sandstone and of slate alternate, and the whole series of strata is nearly vertical; but do you note those small strings and veins of quartz on the further side, there is evidently some change in the formation at this place, the slate also appears to be more finely laminated and acquiring a micaceous texture. Yes, we are now on the margin of a mass of metamorphic schists which extend right across the main divide to the westward, into the Livingstone Creek valley. The hills in front of us appear to present more rounded outlines, and the soil is altered in colour and character, it is now more sandy, and full of quartz grains; and there is also a slight alteration in the species of trees, and in the presence of many endemic herbs and shrubs. Again here, is an outcrop of rounded greyish rock which stands out like a tor of granite, but it is not granite, it is stratified, and the lines of stratification is parallel with that of the slates and sandstones we have left behind us near Tongio, this is gniess, or, in other words, a rock which has been transmuted by powerful plutonic forces out of soft silurian slates and sandstones. Pressure and heat, with the chemical action of percolating meteoric waters on the components of the rock masses may have played the most important part in this transmuting process. We will not stop to discuss the various forces by which the alteration of these crystalline rocks has been effected. Suffice it for us to note that there is an undoubted passage from soft silurian slates and sandstones to mica schists and gneiss. But more of this anon. You ask how those rounded and flattened boulders were deposited on the point of the low spurs to the right of us, fully fifty feet above the present level of the Tambo River? Do they represent the course of the old river bed? If such is the case, the river flats must have been much more extensive than at present. Yes, this is the case, for if we cross the river you will find similar deposits on the opposite spurs at the same level, now separated by a distance of from two to three hundred yards, while the present river, where it winds sinuously through the alluvial flats is not more than ten yards wide. Here we have a geological problem to solve. Are these boulders deposits of fluviatile origin, or is it possible that the displacing agencies may be in any way connected with the glacial period of the latter? If the latter, are there any evidences in the shape of striated surfaces, or other proofs of glacial action? And in either case, to what geologic age do they belong? Are they tertiary or post-tertiary? If the former, of what period are they? Eocene, nueocene, or pliocene deposits, etc.—perchance our examinations higher up the valley, nearer Bindi, may assist us in forming an opinion. Ah! You see a clear, rounded, grassy eminence ahead of you, and the surrounding high ranges are receding—the country is becoming more open. But here is another sideling cutting. What is the formation? It is that of mica schist, of rather coarse texture. A little further on and you will find another change in the country, a change which will bring you to the edge of the limestone formation, to the romantic area of Bindi. Once the bed of the ocean, now a lovely piece of mountain landscape; the scene of an industrious settlement, and for us the field for our progressive studies wherein we may glean some slight insight into the past history of this fair land in which we live.

*(To be continued.)*

# FLOWER GARDENING OF TO-DAY.

BY

E. L. A.

We may say of the system of flower gardening that used to prevail years ago—of beds filled with plants bearing flowers of one colour, or riband lines, or beds divided into panels of blue, white, red, and pink—that it is now a thing of the past. It gave way to a system of gardening that is called mosaic or embroidered, in which succulents, very dwarf bedding plants, both flowering and foliaged, but mainly foliaged, played an important part. Flower gardeners appear to have tired somewhat of that, and the method now followed in places that may be assumed to take the lead in flower gardening is a kind of compromise between the two; and we must admit that it is one of a valuable character. There is now to be seen much more of natural grace and beauty and less of formality than we used to perceive in flower gardens, and we are sincerely grateful for the change. During the summer we made a list of plants best suited to meet the new condition of things, and commencing with hardy plants suitable for edgings and groundwork, the frames, we may term them, which enclose the floral pictures, are as follows:—*Herniaria glabra*, *Sedum acre elgans*, *Sedum lydium*, *Echeveria secunda glauca*, *Sempervivium montanum*, *S. californicum*, *and Veronica rupestris*. Of these all are hardy excepting *Echeveria secunda glauca;* but it is a plant suffering more from wet than from frost, and all these are as useful for winter gardening as for summer decoration. There are several tender plants that can be used in the same way, but only during summer, and they should not be put out into the open ground until all danger from frost has passed away. They are:—Alternantheras in variety, pyrethrum golden feather (though in a general way this will stand through the winter), *Mesembryanthemum cordifolium variegatum*, *Koniga variegata* (an old plant too much neglected in these days), and *Gnaphalium lanatum*. Then there is a very useful group which we can appropriately term "dot" plants—that is for planting among dwarf ones, to rise above them and develop themselves at a higher level. These are:—*Acacia lophantha*, *Abutilons* in variety. *Grevillia robusta*, *Centaura ragusina*, *Chamapeuce diacantha*, *C. eassabonæ* (the fish-bone Thistle), *Lobelia fulgens*, and its variety, Queen Victoria; *Aloe variegata; Yucca aloefolia* and *Y. variegata*. As there are many abutilons, we may state that the three best are Duc de Malakoff, orange red; Boule de Niege, white; and Lemonei, yellow. Now, no summer bedding of any kind may be said to be complete without what are popularly termed geraniums. The best variegated kinds are Sophia Dumaresque, Mrs. Pollock, the Shah, Marechal M'Mahon, Crystal Palace Gem, Robert Fish, Mrs. Laing, Prince Silverwings, Happy Thought, Princess Alexandra, May Queen, Flower of Spring, Lady Plymouth, and Manglestii. Of the ordinary zonal types, the best are Waltham Seedling, Henri Jacoby, John Gibbons,

Bonfire and Master Christine. The following varieties of petunias are most useful as flowering plants in beds:—Shrubland Rose and seedling kinds of dwarf strain; tropæolums; Lobbianum Perfection, trailing; and Bedfont Rival, dwarf and compact; verbena, Purple King; violas, Mr. Gray, white; True Blue and Blue Bell, blue; and Yellow Dwarf, yellow. In many gardens raised beds of stone, baskets, vases, etc., are common, and make fine floral effects when skilfully planted; and the list of plants we are now about to give will be found useful also for centres of beds, viz., *Acavia lophantha*, *Asparagus idulcis*, *Boccnia cordata* cannas in variety, *Ferula communis*, *Humea elegans*, *Nicotiana Wigandivides* and other fine tobaccos, *Rieinus* (castor oil plants, many of which are very handsome), *Zea Japonica variegata* (the variegated Japanese maize, single dahlias, fuschsias, heliotropes, abutilons, and pelargoniums. Then there are a few plants that are very useful for planting by the side of vases, baskets, etc., to fall gracefully over their sides, such as ivy-leaved pelargoniums, both double and single, climbing tropæolums, petunias, these pretty blue *Convolulus mauritanicus*, and the variegated Japanese honeysuckle. A gardener without forethought must of necessity involve himself in difficulties. We have given these names of plants and hints on bedding out, so that the gardener who intends to make an elaborate display in summer may survey his forces and see where it is necessary to augment them. The winter months are the gardener's preparation time for the summer. It is then he must think, plan, select, and obtain. A good gardener is always looking ahead. The one who does this most perfectly is bound to be successful, as far as human agencies can command success.

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# HOW TO COLLECT INFORMATION RELATING TO PHYSICAL GEOGRAPHY.

By W. G. H.

The study of Physical Geography in this country has of late years made considerable progress; the foundation of such societies as the Geological and Geographical, and the origination of an expedition to explore New Guinea, will add much to that progress. In proportion as the most extensive and careful observations of Geologists have led to a clearer conception of the principles and details of that science, the importance of more correct information respecting the physical features of these parts of the world's surface has been magnified even in a geographical point of view. For, without invading into the province of Geology, it is evident that many modifications of the surface of the earth are continually taking place, and this may be distinctly traced to the peculiar conformation of some of its physical features. Thus a lofty mountain, or a projecting headland may be the indirect cause of a distinct sand bank, or a shoal. The effect

produced by these features in modifying either a gust of wind or the set of a current is enough, in the lapse of ages, to cause such an accumulation of materials in particular spots, as will occasion these phenomena. Thus it becomes important, with reference to the mere geographical outline of a country liable to such modifications, independently of pure geological causes, to ascertain and describe all such features, by some of which such important changes may be effected.

But independently of these direct changes, the physical outlines and features of a country exercise a great influence in modifying its meteorological character, as well as the social, political, and commercial position of its inhabitants. It would be vain for us to look for much commerce amongst a people whose country possessed no navigable rivers. The climate of a country will, in many aspects, be regulated by its physical character. The nature of the soil, and the form of country will mainly determine the amount and character of its vegetation. The retentive qualities of clay forming the basis of a low plain, will support a rank and marshy vegetation very different from that which will prevail in a hilly or mountainous district: all these various qualities of vegetation will in their degrees exercise considerable influence on the climate, particularly when taken in conjunction with its greater or less proximity to the equator. The climate, again, cannot fail to influence the habits, social development, and civilization of inhabitants, as well as the Natural History of each country. Thus we trace a close connection between its physical configuration and those questions which have to be discussed in considering, in its extended sense, the geographical features of different districts.

In order to bring together the various points to which the foregoing observations refer, they may be arranged under the following heads :—

1. Form of country.
2. Mountain ranges.
3. Rivers.
4. Springs.
5. Lakes, marshes, and lagoons.
6. Coast line, mouths of rivers, their beds, banks, harbours, nature of shore.
7. Ocean.

1. *Form of country; whether consisting of hills, valleys, or plains.*—The first object which engages the attention of a traveller on entering a new district, is the physical configuration of the country, and this may be described in general terms as flat, undulating, hilly, or mountainous; or the country may be divided into districts, to each of which one of the above terms of configuration may be applied. Each of these, however, is susceptible of great modification. A *flat* country may be a sandy desert, a rich alluvial plain, or a marshy, boggy tract; it may be well watered by rivers and streams, or arid and parched up; it may contain numerous lakes; it may be barren or wooded, or cultivated as arable or grass land; each of these features may be of importance: nor must the nature of its soil be omitted, whether sand, or marl, or clay, as the appearance of the country will often depend greatly on this circumstance. Other important characteristics are its form, extent, and the natural features by which it is bounded, whether mountains, rivers, or seas; how many miles wide, and how many long; whether extending parallel with the coast, or running up between the hills into the interior.

Many of these characteristics, it may be observed, belong equally to other forms which constitute the character of district. An *undulating*

country may be barren, wooded or cultivated; it may be arid or watered by streams, it may contain many lakes, etc. The undulations may be abrupt, or may be gently swelling, and this may be in a great measure owing to the nature of the subsoil, whether it consists of gravel, or sand, or rock; but a country of this description is easily described. A *hilly* country, on the other hand, is more complicated. Not only is the term vague or uncertain, but other features have to be considered in reference to it. Neither hills nor mountains can exist without valleys, and these must also be considered and described at the same time. Then again, the hills themselves may be of various forms and characters; do they extend in long parallel chains or ranges, or are they detached and isolated? Do these ranges of hills radiate or converge? Do they rise abruptly or gradually from the low country? How are they wooded? What do the rocks which constitute their nucleus consist of? If possible, it is desirable to ascertain their height, which, in the absence of complicated instruments and barometers, may be obtained approximatively by marking the exact point at which pure fresh water boils. It is an undoubted fact that water, when heated in an open vessel, boils at a *lower* temperature in proportion as we ascend to a *higher* elevation above the level of the sea. It is hardly necessary to observe that the same accuracy cannot be obtained as with the barometer, but much may be done by the help of well-graduated thermometers.

2. *Mountain Ranges.*—The most important features in the configuration of a country are the mountain ranges by which it is traversed. The exact point of distinction between a hill and a mountain is difficult to describe; in some cases it will be purely comparative, in others it will depend on the general character of the country, and in some it will be arbitrary. But in all cases it will be desirable to endeavour to ascertain the height of the principal points, the direction of the main ranges or chains, and whether they are parallel or not. The ridges also may be *serrated*, or smooth and even, and the summits themselves will be either pointed, or dome-shaped, or flat. Is the mountain insulated or not? and if so, is it conical and sloping on all sides to the surrounding plains; or does it consist of a detached ridge? Many of these points will be found to depend on the geological formation of the country; and, as we have observed, this branch of our subject is very closely connected with that science. It is also desirable to ascertain how far the mountain tops are covered with perpetual snow, and how far down their sides snow lies during the whole or any considerable portion of the year. Is there any marked difference in the slope on one side or on the other? Does vegetation abound more on one side than on the other? *i.e.*, in New Zealand nearly all the mountain ranges, which extend from north to south (and this is their principal direction), are covered on their southern flanks with vegetation, while on the northern flanks, exposed to the rays of the sun, are almost void of vegetation, barren, and generally rocky. This superior vegetation on the southern flanks is probably owing to the less rapid melting of the snows or drying up of the rain than those on the northern flanks. It may also sometimes be owing to the fogs and vapours driven up by the sea breezes, condensed on coming in contact with a colder body, or attracted and retained by the hills themselves. Nor can we complete our information respecting a mountain chain, unless we know the length to which it extends, and the breadth of country which it covers.

Valleys are a necessary complement to mountain masses, and there are many peculiarities connected with them well deserving of observation. Are the sides precipitous or sloping? Are they wide or narrow? well watered

or arid? wooded or barren? Do the rocky sides correspond with each other in their salient and re-entering angles? How far do they extend into the bosom of the mountains? How are the subordinate valleys connected with the principal one? But there is another peculiarity of valleys not to be lost sight of. There are some which convey to the traveller the impression that he is passing though a mountainous or hilly country, so steep, rugged and lofty are the hills by which he is surrounded. It is only on reaching their summit that he becomes aware that the country through which he has been passing is an extensive plain or table-land, intersected by deep chasms and valleys, opened out by volcanic action, or cut through the soft soil by the constant efforts of the streams by which it is traversed; such valleys of excavation as these have been sometimes, not unaptly, called negative valleys.

3. *Rivers.*—Scarcely less important than that of mountains is the effect of rivers in modifying the geographical configuration of a country. From their sources in the mountain recesses to their final disemboguing in the ocean, their course, their currents, and their shores afford an endless variety of remarks and observations. The depth and colour of the water, the rate at which it flows, the cataracts it forms, with the rocks over which its waters are precipitated, the eddies and currents by which its course is marked, are all deserving of notice, as are also the rocks and shoals which obstruct its uniform progress, either interfering with its navigation, or, by projecting beyond its ordinary banks, throwing back the rushing torrent on the opposite shores, thus causing the gradual fall of cliffs by undermining their precarius foundation. Nor in noting the size or extent of rivers should we neglect to state how far up they are navigable, for what vessels; and by what means; whether the mouth is constantly free, or whether it is closed by a bar, and how much water there is generally over it. Some rivers, however, are not only closed by a bar, but, as in the case of Western Australia, are, during periods when the water is low, completely masked by the sand-hills or dunes which are blown up, forming a continuous bank with the hills which skirt the shores, and only when freshets of more than ordinary force come down are these sandy barriers overthrown, and the rivers are enabled to find an uninterrupted outlet. In other cases the effect of beaches thrown up by the constant set of currents in one direction is not so absolutely insurmountable, the streams are only partially deflected from their proper course, and, instead of flowing into the sea in a continued line, are compelled to run for some distance parallel to the coast, until the accumulated backwater has acquired sufficient power to overcome the diminished resistance of the sea-beach: this, however, more properly belongs to the consideration of the coast line.

But the description of a river will be imperfect, unless we state the number and character of streams which fall into it. And here we have to consider the angle at which the rivers join each other, whether the direction of the main stream is altered or not by the junction, the relative size of two confluent streams, and which of them may be said to preserve its former course with the smallest deviation. On the true description of these details must depend the question as to which of two confluent rivers should be considered as the main or parent stream. Rivers are said to be confluent when both branches are nearly equally deflected from their former direction, and that of the united streams may be said to be the resultant of two contrary forces. An affluent is a stream which falls into another, called the recipient, without changing the direction of the latter, and entirely losing its own.

An affluent, too, may generally be said to be smaller than its recipient, and may often be more correctly called a rivulet or torrent: and here it may be remarked that there is a great advantage in attending to the true and proper use of these relative terms, rivers, torrents, rivulets, streams, or brooks; the two latter being more or less synonymous, and a torrent being generally applied to a rapid mountain stream; all these, more or less, bring down detritus from the hills, which is deposited at the mouths of the streams, or wherever other natural causes retard the rapid flow of water. In these cases deltas are formed, *i.e.*, the Zambesi and Nile, which deserve examination, and are either fluviatile, lacustrine, or marine, according as the river empties itself into another river, a lake, or the sea.

But there are other important characters which deserve attention in the description of a river; and chiefly the *name* is to be considered. Does it change during its course, and when and where? How far up from the mouth is the same name preserved? and is it the same on both banks? What is its origin, and by whom was it first given? Then we must enquire what islands are met with in its course? Where are they situated? Are they low? Subject to inundation? Marshy or rocky? or do they stand high above the level of the stream? Are they cultivated or not? What are their natural productions? By what animals are they inhabited? Again, is the river at all affected by rapids, or shoals, or cataracts? and what are the peculiar characteristics of these impediments to navigation? Does the tide flow in them, and how far up is it felt? Does the river abound with eddies or whirlpools, and how are they occasioned? Do they interfere with the navigation or not? Are they accompanied by rocks or shoals? Again, we must ascertain what fords a river offers, and what depth of water is generally found over them: the nature of the bed of the river, particularly in the case of a ford, should also be carefully ascertained.

In addition to these remarks, many other important peculiarities will often be discovered by the careful observer. In some countries, particularly in secondary limestone districts, the rivers are remarkable for their subterranean courses. Suddenly emerging in large volumes from the base of a lofty mountain, they flow across rich alluvial plains, and are then as suddenly lost in the cavities of another mountain, again to issue forth to the light of day in a distant region, after their subterranean course. Nor should the traveller omit to notice, when crossing a river, the direction in which it flows as regards to his own course, whether to the right or to the left. Several distinguished travellers have been unable to correct their observations from not having sufficiently attended to this point.

4. *Springs.*—The phenomena connected with the outbursts of water from the surface of the earth are not only of greatest interest, but a correct observation of them is attended with the greatest practical advantage. The traveller should state, approximately at least, their size or volume, and the nature of the rock or soil out of which they rise; also whether they are pure or mineral, and what deposits are found about the orificies through which they issue; how they are affected by different seasons; whether they are of ordinary temperature or thermal, and if the latter it is desirable to ascertain the degree of heat by means of a thermometer; the touch alone is a very vague and uncertain test. It is also desirable, when it can be done conveniently, to procure specimens in closely secured bottles, of the water of such springs as appear to possess mineral properties, or to contain salts in solution, for the purpose of analysis at home.

5. *Lakes.*—These sheets of water, varying greatly in size, form very important features in the geographical description of a country, and the

traveller should carefully remark their connexion with the other hydrographical characters of the district. Whether they constitute the source of rivers, or are their ultimate recipients? Whether they are or are not connected with the ocean or other great seas; their levels with regard to the ocean, particularly when at a lower level; what rivers flow into or out of them, and whether they contain fresh or salt water.

I cannot here do better than quote the following remarks from Colonel J. J. Jackson's work, "What to Observe," (London, 1841), who says:—"With regard to lakes in general, the observations to be made upon them may be comprehended under the following heads:—

"Name; geographical and topographical situation, height above the level of the sea, and as compared to the other neighbouring lakes; subterranean communication; form, length, breadth, circumference, surface, and depth; nature of the bed and of the borders; the transparency, colour, temperature, and quality of the water; the affluent streams and springs; the outlets, the currents; the climate, soil, and vegetation of the basins; the height and nature of the surrounding hills, when there are any; the prevailing winds; the mean ratio of evaporation compared with the quantity of water supplied; and any particular phenomena; the navigation and fisheries of the lake; formation and dessiccation of lakes." This latter point, depending as it mainly does, on the elevation, or subsidence of the country, may indeed be said almost to belong to the kindred science of geology; and yet it bears so immediately on the physical configuration and geographical features of the country, that it may fairly be mentioned in this place.

Connected with the question of lakes are the scarcely less important features of lagoons and marshes, and smaller hollows called ponds; the extent of these marshes and lagoons should be ascertained, also whether connected with the sea or not, and what portions of them become dry and passable during the summer or other periods of the year. Peat bogs, in many cases the remains of former lakes, may also be classed amongst these features, and their extent and depth and qualities should be ascertained.

6. *Line of Coast.*—This may be indeed said to be the peculiar province of the nautical explorer; but as forming one of the chief boundaries of those great geographical subdivisions, the details of which we have here alluded to, we must not omit a brief allusion to some of its most important features. And, first, with regard to the actual line of coast itself, the traveller should remark the various headlands jutting out into the sea, as well as the deep bays and recesses running up into the land, and affording refuge from the dangers occasioned by the neighbouring headlands; all gaps and breaks in the continuity of hills and cliffs, or mountain ranges, the occurrence and nature of rivers, and streams emptying themselves into the sea, and character and extent of their mouths, the nature of detritus and alluvial matter brought down by them, and whether or not deltas are found near their mouths. In another aspect he should inform us whether the coast is bold or flat, whether formed by cliffs or by sloping plains; and whether the rivers enter into the sea by one or by numerous channels; whether the coast is clear from danger, or whether the sunken rocks and reefs render more than usual precaution necessary in approaching it; whether the sea deepens gradually or suddenly; and whether there are any extensive shoals or sand-banks. Soundings may also be given when practicable, as well as the nature and colour of the sand, clay, or other substances brought up from the bottom of the lead. Do these appear to

belong to the same formation as the adjacent mountains, or to have been carried thither by tides or currents, etc.

It is also desirable to obtain the fullest information respecting the changes which take place from time to time either in the line of coast or in shoals or sandbanks. The latter, particularly when occurring near the mouths of large rivers, or of such as bring down much detritus from the interior, like the Ganges or Mississippi, or even the Hermus in the Gulf of Smyrna, are liable to drift, according to the prevailing winds and currents at different periods. The line of coast is also often subject to considerable changes, in some places gradually extending to the sea; in others eating its way as gradually back inland; and it is remarkable that it is precisely the bold and rocky cliff, which appears to offer such an insuperable barrier to the ocean waves, that crumbles away under their never ceasing attacks, particularly when unprotected by a sloping talus of shingle; while the low, flat, marshy coast, offering no visible resistance to the advancing waves, and constantly covered by the muddy waters, is that which, owing to the deposits of mud and silt left by each succeeding tide, is gradually raised above its former level until it forms a real barrier to the waves; while it is slowly extended by the same process far beyond the spot which the sea formerly reached.

The nature of the shore should also carefully be ascertained; whether it consists generally of sand or mud, or rocks, either in the shape of reefs, or occurring as detached blocks; also whether the landing is easy or not on the beach; and whether this consists of sand or shingle. What bays or coves occur along the line of coast to serve as harbours of refuge? What is the nature of the anchorage? Are there any harbours along the coast? And how far have natural harbours been rendered more available and safe by the erection of breakwaters or piers?

7. *Oceans, their Depths and Currents; Islands, Rocks, Shoals, etc.*—Having completed the enumeration of the principal features to be noticed on shore, I must now point out some of those which call for the notice of the geographer at sea. With regard to the ocean itself, many of the objects of inquiry are the same as those I have already mentioned with respect to lakes. Its depth and its colour, as well as other peculiarities, must be noted. The nature of the bottom should more especially be ascertained, whether consisting of mud or sand, or rock; when varied, the extent of each should be noticed. Not only is the important question of a good holding ground, or anchorage, connected with these facts, but the natural productions to be found in the different seas depend chiefly on the character of the bottoms, and the algæ and other marine plants which grow on them. The direction and strength of the currents must also be observed, as well as their prevalence or usual duration where liable to change. Prevailing winds should also be noticed. Tides also must not be forgotten; their amounts as well as their periods and durations are important. In some inland seas they appear to be influenced by meteorological than astronomical causes, to be dependent on the force of regular winds rather than on the attraction of heavenly bodies. But other incidental pecularities also require notice, such as storms and tempests, hurricanes and tornadoes, particularly when of frequent occurrence, or when recurring at regular intervals or at certain periods of the year. The permanent effects produced by them (if any) should also be registered, such as surfs, breakers, rollers, etc. In the next place the geographer must direct his attention to the islands, rocks, or shoals, which occur in different seas; their extent and position

should be carefully noted, as well as the depth of the water round them; their harbours and facilities for landing; what supply of water can be had; whether near the shore or not, or whether convenient for watering ships, etc.; what rivers or streams (if any) are met with, as well as their natural productions. Reefs and rocks, whether visible, or sunken, and constantly below the surface of the water, as well as shoals, should be examined and described, and the depth of water over them carefully ascertained.

In concluding with this subject, I would also mention a few points connected with the physical features of the country, which, being of an accidental rather than a normal character, did not easily find a place in the more obvious subdivisions of the subject. The traveller should pay particular attention to these phenomena in the physical structure of the country, which are called, by some persons, natural curiosities. Amongst the principal of these are grottoes, caves, and caverns; some of them are not only strikingly beautiful, but of great scientific interest. They are more usually met with in limestone districts than in any other; it is interesting to ascertain their size and extent, and the distance to which they have been traced. Are they traversed by subterraneous streams, and if so, do those streams enter or escape by known channels or mouths, as is frequently the case in the west of Ireland? Natural bridges present another instance of this kind of phenomena. How have they been formed, and what is the nature of the rock of which they consist? Are they stalactitic, or of a more compact nature? Mines are also to be noticed, although they come more directly under the head of geological observation? All volcanic phenomena and earthquakes are also deserving of notice. Springs of fresh water rising up in the sea are not of unusual occurrence; and any information respecting them is always desirable, such as the depth of water, and the effect of fresh water on the surrounding ocean. In short, it may be safely asserted that there is no single fact connected with the physical structure of the earth, falling under the notice of an intelligent observer, which may not be of value or importance either to himself or others, if he will only give himself the trouble of carefully noting it down on the spot, with as much accuracy and detail as circumstances will permit. "Trust nothing to the memory; for the memory becomes a fickle guardian when one interesting object is succeeded by another still more interesting."

# TEMPERATURE.

BY

HEYKIM NABI COSMOS.

"Assimilation in plants," says Pfeffer, "is only possible between a mean specific minimum and maximum of temperature; between these two extremes lies an optimum for the development of the species." This demonstrates that similar laws alike exist for plants as for animals, and that hybridisation is the general, not the exceptional, law for variation of species in plants.

The publication of Humboldt's "Essay on the Geography of Plants" (1805) first formally drew the attention of botanists to the connection between the distribution of plants and the distribution of heat on the surface of the earth. As an advance is made from the Equator towards the pole in either hemisphere, the mean annual temperature declines, and in succession a series of vegetable zones is encountered, merging gradually into each other, though each, where best marked, is perfectly distinguished from its successor. In the tropics there are the palms, which give so striking a characteristic to the landscape, the broad-leaved bananas, and great climbing plants throwing themselves from stem to stem, like the rigging of a ship. Next follows a zone of evergreen woods, in which the orange and citron come to perfection. Beyond this, another of deciduous trees, the oak, the chestnut, and the fruit-trees, which we have acclimatised in our orchards. Here the great climbers of the tropics are replaced by the hop and the ivy. Still farther is a belt of conifers—firs, larches, pines, and other needle-leaved trees, and these lead up to a range of birches, becoming more and more stunted, merging into a region of mosses and saxifrages, but which at length has neither tree nor shrub; and, finally, as the perpetual polar ices are reached, the red snow algæ show the last trace of vegetable organisation.

A similar sequence of facts had long previously been observed by Tournefort in an ascent of Mount Ararat. The distribution of vegetation from the base to the top of the mountain bears a general resemblance to the distribution along the base towards the polar regions. These facts were generalised by subsequent observers. It was established that there exists an analogy between horizontal distribution on the surface of the globe, and vertical distribution at different altitudes above the level of the sea. Even in the tropics, if a mountain be sufficiently high a short ascent suffices to carry us from the characteristic endogenous growths at its foot through a zone of evergreens into one of deciduous trees, and thence again into one of conifers, the vegetation declining through mosses and lichens, till we reach the region of perpetual snow.

In these cases horizontal and vertical distribution present a striking botanical resemblance. There is likewise so clear a meteorological analogy that it is impossible to avoid the conclusion that the

distribution of plants depends very largely on the distribution of heat. And, indeed, what better illustration of the influence of heat could we have than this, that by artificially adjusting the temperature of hot-houses we can cause any plant to grow in any latitude?

But temperature alone does not determine the distribution of plants. If it did, we should find the same species in the same isothermal zones. Throughout the old continent, with the exception of the torrid zone, heath abounds; but in America not a single heath occurs. In the New World, through forty degrees on each side of the Equator, the cactus tribe flourishes; in the Old not a single cactus is to be seen—the spurges there replace them. So again in Australasia, the forests present a melancholy—a shadeless character, from their casnarinas, acacias, eucalypti; whereas, if temperature alone were concerned they should offer the same aspect as the forests of North America and Europe.

As regards animals, the same remark may be made. In the temperate zone, eastward beyond the Caspian there are men whose complexion is yellow, in Europe the complexion is white: the American Indian is red. Asia has its Tibet bear, Europe its brown bear, North America its black bear. The European stag finds in America its analogue in the wapiti, its Asiatic in the musk deer. The wild ox of Lithuania differs from the North American buffalo; and this again from the Mongolian yak. The llama in America replaces the camel of Asia, the puma replaces the leopard and tiger. Brazil has had, in times long past, representatives of its existing sloths and armadillos. Australia neither has apes nor monkeys, no cats, tigers, wolves, bears, hyenas, horses, squirrels, rabbits; no woodpeckers or pheasants. In place of them it has the kangaroo, wombat, ornithoryncus, cockatoo, and lories.

Then, though heat is a dominating influence in the distribution of plants and animals, it is by no means the only one. There are also other conditions, such as the rainfall, the character of the soil, etc. It has been found convenient to group all these together, and to speak of them as, under a single designation, "The environment."

Change in the environment and change in organisms go hand-in-hand. Were the warmth of the tropics diffused into the polar circle, a tropical vegetation would replace the vanishing snows. Were the ices of the poles to spread over the temperate region, the reindeer would accompany their invading edge. While the environment thus influences the organism, the organism reacting, influences the environment.

The most striking instance of this, perhaps, will be found on comparing the constitution of the atmosphere before and since the carboniferous epoch. Prior to that epoch all the myriads of tons of coal, a substance now inclosed in the strata of the earth, existed as carbonic acid in the air. By the agency of the sunlight, acting on the leaves of the luxuriant vegetation of those times, this noxious gas was gradually removed, and replaced by an equivalent volume of oxygen.

Anterior to the coal deposit, the fauna was cold blooded and slow respiring. The flora thus changed the aërial environment, and this in its turn reacting, changed the fauna. It is on all sides admitted that plants tend, by their removal of carbonic acid from the atmosphere, and replacing it by oxygen, to compensate for the disturbance occasioned by animals. In this way, through very many centuries, the same percentage constitution of the atmosphere is maintained, the sum total of vegetable being automatically adjusted to the sum total of animal life—automatically, and not by any interference of Providence—a fact of great value in its connection with the

theory of Evolution. For, if we admit, what has been conclusively established by direct experiment "that plants would grow more luxuriantly in an atmosphere somewhat richer in carbonic acid than the existing one, we may see how upon this condition depends a principle of conservation, which must for ever retain the air at its present constitution, no matter how animal life may vary."

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# SCIENCE AND RELIGION.

BY

ROBERT THOMSON, F.I.A.

In this short article I do not intend to dive into the arcana of scientific discoveries of past ages, nor to penetrate the mysteries evolved in this latter part of the nineteenth century; whereby time is rendered nearly into an instant, space on our globe is nearly obliterated, the powers of the elements are made subservient to our daily ends. We convey in little more than the twinkling of an eye our thoughts from hemisphere to hemisphere. We put a girdle round the earth in forty minutes. We converse in well-recognised tones with friends miles and miles away. Mr. Porcus, of Chicago, chats with his agent, Mr. Nauticus, in New York, on the state of the markets in all the Continents. Presto! Nauticus receives a cargo which speedily crosses the Atlantic, and is soon converted into the bone and muscle of the indomitable Briton.

You want to light your chamber. Directly you control Jove's thunder-bolts, and make him your humble menial. You use the sun and get a perfect picture unblurred by the prentice hand of man. You transform the water into gases, and make them your patient servitors. You transmute almost everything existing on the face of the earth for the exigencies of your daily life. But Vulcan is one of the gods we have not wholly subdued; although we may have been bringing even him to his bearings a little. Where no gold, no tin, no silver, no antimony, none other of the metals now essential to our daily life were supposed to lurk, they are now crushed out in volumes as fabulous as the "One Thousand and One Arabian Nights."

Yet still, I have no doubt that, many "tailings" now abandoned will tell a tale of wealth which would make the mouth of Croesus himself to water, in not very distant years to come.

While fifty years ago Australasia was mainly dependent on the old country for supplies of the necessaries of life, its sheep were increasing from the few imported by the Macarthurs and one or two others at freight prices, which

would now be regarded as so exorbitant that the most zealous shipping clerk would be ashamed to ask. Now the tables are turned. Some forty-five years ago the growth of sheep and cattle in proportion to the consuming population was so great that flocks of sheep and herds of cattle were destroyed, as their owners could not pay the transit dues to market and were quite uncertain as to the market they could obtain.

Then came the grand discovery of "boiling down," which enabled our pioneers to live on the tallow they obtained from the stock they slaughtered, while the rest of the carcase was left to rot.

Then wool began to be a great industry. It was shipped home probably in half-a-dozen ships of modest tonnage in a year. And so the squatter of the time, now much maligned by those who have not "borne the burthen and heat of the day," improved their position from insolvency to comparative affluence. I do not say that many of the men of that generation were able to see any further beyond their noses than most of us can now do. These men were (probably some of them) not actuated by pure philanthropy; but as long as they succeeded in developing the resources of their adopted land from hundreds of pounds to millions sterling, are they not entitled to their small share in what they have themselves created? However, as I am debarred politics in this Journal, I will only say that, in my opinion, Mr. Hornyhand has much less to complain of in respect of his treatment in the Sunny South than has Mr. Enterprise or Mr. Foresight.

But the reader will naturally ask what has all this to do with the subject matter of this article? I, therefore, now propose in all humility to express in as few words as possible, my own ideas. First, then, I say that the truths of modern science do in no way undermine the foundations of the faith of those who believe in these "wells of pure English undefiled," contained in the authorised translation of the Testaments, Old and New.

The Book of Genesis or of The Beginning, was not written as a treatise on astronomy, geology, geography, or metaphysics. It was written for the intelligent understanding of an unlettered race, and made so clear that the simplest reader or listener could understand its purport. If I go to speak to a popular audience, I have to use very different language, have to use similes, have to express in very general terms the facts which I might be able to express exactly with a few symbols (utterly unintelligible to the popular audience), to a meeting of my professional friends. I do not mean to say that Moses was a Copernicus, or a Galileo, or a Lyell, or a Darwin. I have never thought it a desirable research as to what Moses and the Prophets did know or not know, nor as to the extent to which prophecy has been fulfilled. Such researches I leave to the Cummings and other fanatics whose too much learning has made them mad. "Science, falsely so called," I beware of. The "profane and vain babbling" of those who wrest scripture to their own shallow philosophy, of whom the poet writes—

"A little knowledge is a dangerous thing."

are not for me. I should like either to

"Drink deep or taste not the Pyerian spring."

The heaviest hammer of the greatest geologist does not affect the Mosaic records of creation. In fact every discovery of both science and archæology tends to prove Mosaic records—"With God, one day is as a thousand years, and one thousand years as one day." Metaphor and allegory prevail amongst all Oriental races. A right undertanding of the style of diction is essential to a right understanding of the truths of Scripture and

science. Bishop Colenso simply lost his head in endeavouring to drive it through his hard algebraic formulæ against the impregnable wall of scriptural phraseology, properly interpreted. When he attempted to disprove the record which he swore to teach, he was disloyal to his Sovereign and to his church. He disputes the increment of population recorded in the Old Testament books. Yet nobody can deny the fact that the Anglo-Saxon race has, since about 150 years ago, multiplied more than tenfold. This, spite of all the wars which have cut down now and again the flower of our youth; the internecine slaughter of the North and the South in America within our own recent times, for example.

I think Colenso once calculated the fecundity of a pair of rabbits, living under ordinary circumstances. The numbers he found probably existing at the expiry of five years, could only be stated in millions. It is thus evident that but for war, and its follower pestilence, the world would now be overcrowded altogether. Malthus was only, after all, a poor imitator of the old Spartans. Kill the weakly ones and let the strong live was the dogma of the Spartan melthusian days, principally among some to whom little brain and considerable leisure has been vouchsafed. Out of his own mouth I think Bishop Colenso is convicted of misinterpretation of the Book of Books he swore to interpret.

Now, at the present time, the more our armies have sought to mow down the hordes in the Soudan and elsewhere, the richer is the crop. As it was in the days of Joshua so is it now. A bloody field is fought. A pestilence stalks over the land. Yet the country devastated flourishes again, and, spite of all, its population is scarcely reduced to any appreciable degree.

I now close this discursive paper, written in the turmoil of daily work, simply asking my readers, of whom I hope there will be many, to study side by side their science, no matter how deep, no matter how speculative, with the Scripture as it is given to us in the Old and New Testaments, and the more they ponder over the alleged conflict between the revelation of our Nineteenth Century science and the plain facts in the Scriptures, the more certain they will be to reconcile the one with the other, and the less will they stumble in the dark into holes and quagmires prepared for them by those who have become proficient in "science, falsely so called."

# OSTRICH FARMING IN AMERICA.

BY

R. L.

With a climate boasting of 200 days of unadulterated sunshine, 125 days fair and mild, with an average of more sun than clouds, and 40 days only devoted to inevitable rain, fog, and mist, California, especially in its southern districts, seems well adapted to the pleasant, profitable industry of ostrich farming. The successful establishment of several ranches, and the superior quality of their produce, has fully proved this fact, and the wisdom and sound commercial policy which promoted its introduction into a country fitted for such a variety of enterprise. Indeed, it might be difficult to determine what industry, undertaken with intelligent energy and manly, conscientious working will, free from the "can't-be-done" verdict of the modern amateur settler (which may be interpreted "won't work or think,") could practically fail with the numerous advantages California offers.

Following the advice contained in the Consular report to the State department of the United States, suggesting ostrich farming as an industry which would probably prove successful in the milder portions of the country several ventures were made, and the new industry is already in the full tide of successful prosecution in various Californian counties. The *New York Industrial News* (1883), contains the following report:—"The ostrich farm at San Diego, California, established by an incorporated company of San Francisco, is now pronounced a success. All the birds (the same which reached the city last November) are doing finely, and the chicks which have since appeared are in fine condition; most of them are incubated. The ostrich eggs are a wonder to all who see them for the first time. The company has more orders for birds than it can promise to fill this season, and asks its own prices, which are 100 dollars to 120 dollars for a healthy chick four months old. These chickens will yield their first feathers when eight months old, which, picked, should bring at present market prices from seven dollars to ten dollars. The next picking, eight months from the first, should bring from forty to fifty dollars, and in two years the bird, if well cared for, is expected to be in full plumage, and to yield annually 200 dollars worth of feathers. Ostriches breed when four years old, and from a pair is expected an average of fifty healthy chickens every year for twenty years.

San Diego County, it may here be remarked, ranks next to San Bernardino County in size, containing 15,156 square miles, and extends 150 miles from north to south, and from the Pacific Ocean to the Colorado River—a distance of a hundred miles east and west. Two branches of the coast range divide it into three divisions. The first, east of San Jacinto Mountains, comprises a portion of the Colorado Desert, declining up to 260 feet below the sea level, yet containing the substance of fruitful soil, which

by irrigation from the Colorado River could be made an oasis. The second division is a series of valleys and plains, with sheep and cattle grazing, and splendid arable land. The third section, between the foot hills and the ocean, consists of mesas and valleys watered by the San Diego Sweet Water, San Louis Key, and other rivers. The Bay of San Diego is twelve miles long by two wide, with safe entrance and anchorage for large vessels. The climate is nearest perfection of perhaps any. Four miles beyond the new town of San Diego is the Western Dominion of the Californian Southern Railway National City, where the largest terminal grounds of any line of the United States have been prepared, covering an area of 225 acres. All the buildings for a trans-Continental line have been already constructed, though hardly warranted, as the California Southern extends as yet but 126 miles. But San Diegons look forward confidently to a junction with the Atlantic and Pacific. The line of division between California and the Mexican Peninsula of Lower California is fifteen miles south of San Diego; the distance by water to San Francisco, 500 miles. Anaheim, the oldest of the Coast Colonies was also selected for ostrich ranching, and with the same successful result.

From the *New York Tribune* (1883), the following interesting account of a visit to an ostrich farm near Anaheim, by Mr. W. G. Le Duc is taken:—

"My attention was called to the profit as well as practicability of ostrich breeding in this country some years ago by a young gentleman fresh from college, who has since taken orders in the Episcopalian Church, and who prepared for me a statement of the case as it then stood, showing, conclusively enough to warrant the experiment, that an industry of importance might easily be built up in various parts of the United States. Having, therefore, recommended the business, and tried without avail to have the General Government do something to promote ostrich raising, it may be understood that I felt interest enough to go out of my way to visit him in his new home near Anaheim. Our first visit was to the incubator. A broad shelf on one side contained about fifty ostrich eggs, and any number of eggs of the brown Leghorn chicken (a favourite strain on Californian poultry farms). The incubator has been used for hatching those eggs prior to trusting the more valuable ostrich eggs to its care. These ostrich eggs are truly wonderful seen for the first time. Elliptical in form, they weigh about three and a half pounds, measuring in circumference eighteen inches by nineteen inches, and hold equal to a quart measure. The colour is creamy white, the shell porous, and pitted all over equally. Of these sixteen eggs had been put in the incubator up to the time of my visit (June 29th), the remaining eggs and future layings being reserved for the Halsteed incubator, which made such a reputation in the Cape Colonies for hatching ostrich eggs. The sixteen eggs were placed in the incubator on May 14th, 15th, and 16th, and the period of incubation had nearly passed, for the chickens were moving in their shells ready for advent into Californian life. One had come already as *avant courier*, and is a beauty of its kind, covered with speckled brown downy feathers, except on head, neck, and legs. Only a day old, he is wild, shy, and active as an antelope, and the size of a full grown Leghorn hen. Restless, uneasy, and in constant motion, with enquiring eyes he awaits his tardier companions to join him in his feather producing career. Preparatory to any nourishing food, he had placed before him a tray of small gravel stones and crushed sea-shells; subsequent to this grinding tonic he had a handful of chopped *alfalfa* (Lucerne). This lays the foundation for a meal of cracked corn and water, and after that the ostrich was considered on the straight road to

distinction as the first ostrich artificially hatched in America. [This statement seems to be incorrect, as ostriches were hatched by incubator on Mr. George Beaumont's ostrich farm at Merlo on the 21st of January, 1881, two years and a half previous]. Our attention was next turned to the paddocks and farms of the Anaheim ranche. Leaving the front door facing east, we turned south, and saw before us an enclosure of four acres in the form of an L, made by a post and board fence only four and a half feet high, of three inch thick and twelve inch wide red wood boards, well nailed on, and sound. A kick from an irritated ostrich would break an ordinary fence board into splinters. The parallelograms making the L are divided into twelve paddocks, in which the stock of twenty-one ostriches—eleven hens and ten cocks—are placed. The paddocks are bare and sandy, but surrounding the breeding grounds is an excellent growth of *altalfa*, turnips, cabbages, onions, maize, and beets, all of which have been planted and grown since March 25th, and in time for the voracious chickens which are expected to rally round their parents in all summer campaign in the fifty-four acres of green food provided for them. In close proximity to the paddocks is an Artesian well, 300 feet deep, which discharges four feet above the surface 12,000 gallons of water each hour, sufficient to irrigate in this locality from 200 acres to 300 acres of land planted to ordinary crops and with average rainfalls. The entire ostrich farm is one mile square of 640 acres, and a level plain. This enterprise is fairly pronounced a success, as the company has more orders for birds than it can promise to fill."

Thus, it will be seen, that with a moderate outlay of capital, and in a comparatively small space of acreage, a real "Eldorado" can be found by ordinary intelligence, perseverance, and labour, light and pleasant in comparison to that required in less profitable pursuits. The settlement of Anaheim was founded, I believe, in 1857, and almost exclusively by thrifty Germans. Most of the land was sub-divided into twenty-five-acre lots, a town site with an equal number of building lots being reserved as the centre. Each colonist was entitled to a 20-acre field and a town lot. An irrigating ditch, carrying water from the Santa Ana River, five miles distant was constructed with cross ditches, the borders being planted with trees This section is about to become one of the greatest wine-producing districts of the United States, and this year promises a grape crop of unprecedented quantity and quality.

Again from a Texas paper, *San Antonio*, October 2nd, 1883, I take a notice of the Harris County Ostrich Farm:—"Since the Government of the United States, through Consular correspondence, drew attention to this prospective interest to domestic trade, an extensive exploration of localities for ostrich raising has been made by agents on behalf of individuals and combinations of moneyed men in Europe, who have invested in the purchase of southern and south-western lands. Southern Texas appears to be the most promising field (coastwards) of operations, and an Anglo-American Company is about to locate an ostrich farm in Harris County, of which Houston is a thriving city. Divers railway lines, embracing up to 6000 miles of land transportation, are in connection with the Missouri, Pacific, the Wabash, and the St. Louis, and the Pacific Railway Company, which in part passes through Harris and the adjoining counties. The Brazilian Government offering peculiar inducements by land grants to this branch of stock raising, and in view of the immense profits realised by African ostrich breeders in Natal, Cape Colonies, and Algeria, it was a wise and timely movement. Should this enterprise in Southern Texas be

advanced to completion as an establishment of the industry in the United States, we may expect Texas to add another very lucrative branch of soil operations to her cotton fields, her vast cattle ranches, sheep and goat walks, sugar plantations, her timber forests, and thriving agriculture generally. With trade and transportation facilitating the movements of various industries, there is nothing to prevent Lower Texas from assuming position as the most inviting and remunerative seaboard stretch of our Republic. Ostrich farming, developed as it may be, will constitute no light interest, even though its weight may be only feathers, and if Texas shall in the near future supply some 20,000 of American wives and daughters with bird plumage, now commanding from three dollars to twenty dollars a feather, our extreme South-Western States may plume herself on profitable trade to come."

The fact that ostrich farming must, to make it pay, be carried on in a climate and under weather and soil conditions admirably adapted to other lucrative agricultural industries, and one thoroughly healthy and enjoyable to the settler so engaged, should make it desirable from every point of view.

# *PROCEEDINGS OF SOCIETIES.*

## VICTORIA.

### The Geological Society of Australasia.

The monthly meeting of the Geological Society was held at their offices, Phœnix Chambers, Market Street, on Friday, the 3rd July, in the afternoon. Mr. A. C. Macdonald occupied the chair, and there was a large attendance of members. Baron F. von Mueller was elected one of the Vice-Presidents, and Dr. T. S. Bulmer a member of the Council. The Hon. Secretary (Mr. R. T. Litton) read correspondence from His Excellency the Governor, accepting the position of patron to the Society; a letter also was read, written by him to the South Australian *Register*, urging the South Australians to establish a branch in Adelaide, and a leading article in the same journal, warmly seconding the letter. The Hon. Ed. F. Litton, M.A., Q.C., etc., of Dublin, and Colonel Brooke, R.E., etc., were unanimously elected honorary members; and the following gentlemen ordinary

members :—Mr. W. T. Cuthbert, M.D., Queensland ; Mr. J. W. Morton and Mr. George M'Kenzie, C.E., both of Beechworth ; Mr. F. C. Mason, M.L.A. ; Mr. John Blair, M.D., ; Mr. W. K. M'Lean, Mr. W. H. Heginbottom, and Mr. H. W. S. Verity, M.D., of Cheltenham. A vote of thanks was passed to the following gentlemen for their donations to the library of the Society :—The Minister of Mines, Victoria ; the Colonial Secretary, Western Australia ; the Minister of Education, New Zealand ; and Messrs. T. S. Bulmer, M.D., A. C. Macdonald, and R. T. Litton, F.N.S. The joint donations consisted of some forty-three volumes and seventeen maps.

A letter was read from one of the continental scientific associations, congratulating Mr. Litton on the foundation of a society for this branch of science in Australasia.

The following is a complete list of the office bearers of this Society :—President, the Hon. J. F. Levien, M.L.A. ; Vice-Presidents, Professors F. M'Coy, F.R.S., and Baron F. Von Mueller, K.C.M.G., F.R.S., Ph.D., M.D., F.R.G.S., F.L.S., F.G.S. etc. ; Council, A. C. Macdonald, Hon. L. L. Smith, Mr. Justice Williams, Hon. J. Madden, LL.D., M.L.A., T. S. Bulmer, M.D., Sir Arthur Nicholson, Bart., Robert T. Litton, F.N.S., Joshua Lake, M.A., Professor Elkington, LL.B., T. F. Bride, LL.D.; Honorary Treasurer, Alexander Porter ; Honorary Librarian, Arthur E. Clarke ; Honorary Auditors, George Wright and R. J. G. Leigh ; Honorary Secretary, R. T. Litton, F.N.S. This Society was founded by Mr. R. T. Litton, F.N.S., in the month of April, 1885, and now numbers nearly a hundred members, and has a library of some seventy volumes.

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## The Royal Society.

The ordinary monthly meeting of the Royal Society was held Thursday, 9th July, at their hall, Victoria Street, Professor Kernot, the President of the Society, occupying the chair. The Rev. W. Williams was elected as a country member of the Society; and Messrs. L. H. Chase and O. F. Colvin were elected associates. Mr. G. W. Selby, jun., presented a "Catalogue of Scientific Papers, compiled by the Royal Society of England, vols. 1 to 8."

Dr. Henry, in the absence of Dr. Nield, the Librarian of the Society, proposed the following motion :—

"That the Royal Society of Victoria places on record the lamented death of the late Dr. Edward Barker, and expresses its sense of the services which he has rendered to the Society."

He mentioned that Dr. Barker was one of the founders of the Philosophical Society of Victoria in 1857, out of which the Royal Society sprang, and that he took a very active part in the affairs of both Societies.

Mr. E. L. Marks seconded the motion, which was carried unanimously. Mr. G. S. Griffiths (for Mr. James Stirling, F.G.S.), read a paper entitled "Notes on the Evidences of Glaciation in the Australian Alps." The writer said that on examining the map of Victoria it would be seen that the watershed line of the main dividing range was deflected south-easterly from Mount Hotham round the sources of the Livingstone Creek, forming a somewhat parabolic curve. It was on that area that the evidences of

glaciation were to be seen, and they consisted of—1. Grooved, striated, and shattered rock surfaces. 2. Heavy transported boulders, bouldery wash clays, and auriferous gravels. 3. Erratics and morainic *debris*. 4. Glaciated contour of country and eroded lake basins. 5. *Roches moutonnees*. The watersheds and valleys of the Victoria River and Livingstone Creek were described at length by Mr. Stirling. He said that in the former valley laminated clays, waterworn boulders of basalt, *debris* of metamorphic schists, and other geological features, were found so marked and situated as to show that the district had been subjected to glacial action, and justified the inference that the Victoria and Spring Creeks, together with the subalpine basin at Parslow's Plain, were occupied by large masses of ice during the later pleistonic times. The evidences of glaciation in the valley of the Livingstone Creek were also described, and Mr. Stirling held that from the various signs in the valley, the heavy bouldery deposits, and what he believed to be morainic *debris* in the valley, it was highly probable there had been three interglacial periods in it since pliocene times. In concluding the paper, Mr. Stirling stated that he had received a very interesting paper from Dr. von Lendenfeld, of Sydney, in which that gentleman gave the results of his explorations, in January last, of the Kosciusko plateau, and established the fact of the glaciation of the highest mountain in Australia. Dr. von Lendenfelt, however, said in his paper that the climate of the country at the time of glaciation was not very cold, so that the glaciers only covered the highest part of the Australian Alps, and were consequently very small. If, however, his (Mr. Stirling's) conclusions were correct, the glaciers not only covered the whole of the Australian Alps, but might have extended their influences to the lower levels down the Murray basin.

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## The Historical Society of Australasia.

The ordinary monthly meeting of the Historical Society of Australasia was held at their office, Phœnix Chambers, Market Street, at the latter end of last month. Mr. David Blair, the President, in the chair. The minutes of the previous meeting were read and confirmed. Mr. R. T. Litton, the Honorary Secretary, having read the correspondence, the following donations were received with thanks :—Two volumes and three maps from the Minister of Education, New Zealand ; two volumes and three maps from the Colonial Secretary, Western Australia ; three volumes Mr. A. C. Macdonald, one volume Mr. R. T. Litton. The following gentlemen were elected members of the Society :—Arthur E. Clarke, Thomas Dickson, George Mackay, LL.D.; John Blair, M.D., F.R.C.S.; W. T. Cuthbert, M.D., F.R.C.S.I., of Ravenswood, Queensland. Mr. James Blackburn, C.E., proposed, and Mr. R. T. Litton seconded, that Messrs. J. S. Jenkins, C.E., and Alex. Porter be elected Honorary Auditors of the Society. Mr. A. C. Macdonald proposed, and Mr. R. T. Litton seconded, that Mr. Arthur E. Clarke be elected Honorary Librarian of the Society. Mr. James Larnach proposed, and Mr. Alex. Sutherland seconded, that the resignations of Mr. A. P. J. Fisher and Mr. R. T. Litton, as members of the Council, be accepted with regret, and that George Mackay, LL.D., and John Blair, M.D., be elected to fill the vacant offices. These motions were carried unanimously.

An interesting letter was received from Mr. James B. Walker, of Hobart, stating, "That he has been for some time desirous of forming a Tasmanian Historical Society, so that some systematic efforts might be made to collect and preserve materials for our history, which, failing some such means, are likely to be irretrievably lost. Since hearing of the Historical Society of Australasia, it has struck me that, if our means permit, it would be preferable to establish a Tasmanian branch of your Society. It is possible that documents relating to the early days of Australasia might be discussed against private records, and that in other ways we in Tasmania might be able to assist you in your work." The Honorary Secretary informed the meeting that he had written to Mr. Walker thanking him for his letter, and sending him a copy of the Constitution of the Society, as well as other useful hints for the foundation of a Tasmanian Branch.

The following is a complete list of the office bearers:—President, David Blair; Vice-Presidents, A. J. Skene, M.A., Professor Elkington, LL.B., M.A.; Council, A. C. Macdonald, James Blackburn, C.E., Alex. Sutherland, M.A., James Smith, C. E. Clarke, James Larnach, Joshua Lake, M.A., George Mackay, LL.D. *Ex officio*:—R. T. Litton, F.N.S.; C. L. P. Chase. Honorary Treasurer, C. L. P. Chase; Honorary Librarian, Arthur E. Clarke; Honorary Auditors, Alex. Porter, J. S. Jenkins, C.E.; Honorary Secretary, R. T. Litton, F.N.S. This Society was founded in the month of March, 1885, by Mr. R. T. Litton, F.N.S.—and it now numbers some sixty members.

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## The Medical Students' Society.

A meeting of the Medical Students' Society was held on Thursday evening, 9th July, at the Melbourne Hospital. Dr. Williams was in the chair. About forty members were present, and seven new members were elected. It was agreed to write to the committee of the Melbourne Hospital, and urge them to establish a special department for the treatment of skin diseases, and any other special departments possible. Attention was drawn to the fact that up to the present time nothing had been done by the medical profession in this city with regard to the study of skin diseases, and that although there were numbers of interesting cases scattered amongst the out-patients of the Melbourne Hospital, no attempt had been made either to establish a special hospital or ward, where these cases could be studied collectively.

Mr. W. A. Wood read a paper on phthisis, or consumption. Commencing with a definition of the disease, he enumerated the varieties, and dwelt for some time on its œtiology. In considering the hereditary nature of the disease, he denied the possibility of a child directly inheriting the disease from its parents, although a constitutional weakness and a consequent predisposition was often handed from parent to offspring. In regard to treatment, great stress was laid on prophylaxis in all persons who are predisposed to this affection, and fresh air was recommended as being by far the most beneficial agent the physician could recommend.

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The fortnightly meeting of the Medical Students' Society was held on Thursday, the 23rd July, at the Melbourne Hospital, about twenty members being present, Dr. Moore in the chair.

Dr. F. D. Bird was elected an honorary member of the society, and several others were elected members. Two members were proposed for the position of assistant-secretary, and, after a ballot, Mr. Millar was elected. Indignation was expressed at the way in which the students' petition with regard to clinical lectures had been treated by the council. This petition, which was sent to the council more than seven weeks ago, embodied the students' views as to clinical lectures, but since it had been handed to the registrar nothing had been heard of it. It was resolved that the secretary should write to the registrar, and inquire about the petition.

Mr. C. P. Dyring read a paper on sputa, their varieties and indications, describing the physiology of expectoration, and detailing the microscopical structure and chemical composition of sputa of different diseases. After mentioning the various diseases which were characterised by special varieties, he showed how diagnosis and prognosis might be influenced by a careful examination of the sputa.

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## Field Naturalists' Club.

The ordinary monthly meeting of the Field Naturalists' Club was held at the hall of the Royal Society, on Monday evening, the 11th of July. The Rev. J. J. Halley (President) occupied the chair. The following persons were elected members of the Club:—Dr. Wigg, Mr. C. Casimer, Mr. J. Searle, and Master Coles. Dr. J. E. Taylor, F.G.S., F.L.S., and Honorary Member of the Geological Society of Australasia, was unanimously elected an Honorary Member of the Club. Mr. F. Wisewould read a paper on "A Visit to the Chudleigh Caves, Tasmania," in which he described the curious formation of the district. An interesting note on a tortoise found in the solid rock on the Great Northern Railway, New South Wales, in 1859, was contributed, by Mrs. J. Simson, from papers left by the late William Keene, F.G.S. Mr. C. A. Topp described a tabular form of "Botanical Key," constructed by Mr. P. Dattari, which gave rise to much criticism as to the value of such means for teaching Botany. A good collection of exhibits in Natural History and Geology was shown by the members.

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## The Victorian Institute of Architects.

The Victorian Institute of Architects held their usual Quarterly Meeting at Selborne Chambers, Little Collins Street, on Monday evening, the 13th of July. Mr. Thomas Watts, the President, occupied the chair, and Mr. E. J. Henderson was duly elected an Associate, and Messrs. W. Pettit and Charles Cuthbert were nominated as Associates. The sum of £5 5s. was voted to the Gordon Memorial Fund.

## National Agricultural Society of Victoria.

The monthly meeting of the Council of the National Agricultural Society of Victoria was held at Kirk's Bazaar, on Tuesday, 14th July. The members present were—Dr. Plummer (President) in the chair, Messrs. Job Smith, W. Learmonth, D. R. M'Gregor, W. Thomson, A. Patterson, J. M. Peck, S. G. Staughton, J. Hearn, D. Mitchell, F. Henty, D. Munro, J. Buncle, J. Currie, J. G. Brisbane, F. Peppin, C. Lynott, J. Garton, S. Gardiner, and J. Finlay.

Mr. F. S. Roberts was elected a member of the Council in the place of Mr. G. D. Carter.

Dr. Plummer was elected to represent the Society on District Board No. 11, in connexion with the federation of agricultural societies.

The Executive Committee recommended that His Excellency the Governor be requested to open the show at noon on Thursday, August 20; that he and Lady Loch be invited to lunch with the Council on the ground; that Sir William and Lady Clarke be invited, together with the members of the Ministry; and that a lady's ticket for luncheon be given to each member of the Council. On the motion of Mr. M'Gregor, the report was adopted.

The Journal Committee reported that they had received an offer from Messrs. Kemp and Boyce to print and publish a journal for the Society, and pay a premium of £25 per annum for the privilege of obtaining advertisements for it. They recommended that the offer be accepted, the first number of the journal to be issued in August, and that Dr. Plummer and Messrs. F. Peppin and D. Munro be appointed an editing committee. Mr. Thomson moved the adoption of the report, which was seconded by Mr. Peck, and carried.

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## Horticultural Society of Victoria.

The Annual Meeting of the members of the Horticultural Society was held on the 14th July, in the Bourke Street Coffee Palace. Mr. David Carson, Vice-President, occupied the chair, and there were about fifty members in attendance.

The annual report and accompanying balance-sheet, together with report of the Gardens Committee, were unanimously received and adopted.

The election of office-bearers for the ensuing year resulted as follows;—President, Mr. W. Anderson, M.L.A.; Vice-Presidents, Messrs. M. L. Hutchinson and G. Brunning; Treasurer, Mr. W. Bell; Auditors, Messrs. W. J. Stoddart and A. C. Wilkinson; Committee, Messrs. D. Carson, J. C. Tyler, G. Lynch, W. Bell, W. J. Stoddart, A. C. Wilkinson (amateurs); H Boyce, W. Bailey, R. Ardagh, W. Murdoch, J. F. Roberts, and J. Taylor (practical).

## The Medical Association.

On Wednesday, 22nd July, the annual meeting of the Victorian branch of the British Medical Association was held at the Royal Society's Hall; the President, Mr. J. T. Rudall, was in the chair.

The Honorary Secretary, Dr. Neild, read the report of proceedings of the Council during the past year; and the annual balance-sheet was submitted by the Honorary Treasurer, Dr. Graham. During the year ten new members had been elected, which, added to the revised list, brought the effective strength to a total of seventy-four. Eight general meetings had been held, and seventeen subjects brought before them; also numerous interesting exhibits had been submitted.

The Medical Defence Association had been absorbed into the branch. There had been held ten meetings of the Council. The financial condition of the Society was satisfactory; the Treasurer's report showing the income, including last year's balance, at £129 13s. 9d., and the outlay as £92 2s. 11d., leaving £37 10s. 10d. in hand.

Both report and balance-sheet were adopted.

The election of officers for the ensuing year then took place with the following results:—

President, Dr. Henry; Vice-President, Dr. Willmott; Honorary Treasurer, Dr. Graham; Honorary Secretary, Dr. Springthorpe. Council, Drs. Neild, McMillan, Cutts, and Simmons, and Messrs. J. T. Rudall, and W. Barker; Auditors, Drs. Haig and Stewart.

The chair was then taken by Dr. Henry, newly elected as President, who returned thanks for the honour done him. He felt especially proud of being the first Victorian elected to that important office, and while occupying it would endeavour to follow the many bright examples afforded by his predecessors, and would do all in his power to develop Medical Science and obtain a proper representation of the profession in medical politics.

Mr. J. T. Rudall, the retiring president, then read an address. He first referred to the many advantages which in modern times were derived from the improvements made by medical science in the use of preventive medicines, and the necessity for altering the method of imparting clinical instruction to students in the colony, so as to make it similar to the home system, which provided for such teaching by the appointment of officers whose duty it was to instruct the students in the diagnosis and treatment of the common and less severe kinds of injury, such as make up the bulk of practice. He regretted that the absence of satisfactory relations between the Medical School at the University and the Hospital was again apparent, and hoped the University Council would regard its dignity, and not compromise its position by consenting to recognise, as lecturers in the University, all those who were, or might be under present regulations, elected physicans or surgeons to the Melbourne Hospital; for by such conduct the Council would only lend its aid to perpetuate a vicious system, and, in all probability, if the present difficulty as regards the clinical lectures was surmounted in such a manner, other, and possibly greater, difficulties would confront the Council in the future. It could be truly said that for years past the election of physicans and surgeons to the chief hospital of the colony had been a periodical scandal; had put a premium on dishonourable and undignified practices, and was detrimental to the best interests of the hospital, the profession, and the community at large. But there was more still to be done to redeem the Hospital from being full fifteen years behind

the time : *e.g.*, the appointment of surgical and medical registrars, publication of accurate statistics, improved nursing, and ambulance and telephonic arrangements, though he was afraid it was useless to say more on such subjects at present. As regards Medical Education here, it compared unfavourably with that of Great Britain, though the fault was not owing to the want of intellectual capacity and industry on the part of the students, neither was it due to incapability on the part of the teachers, but the heavy drag of a worthless and inefficient Hospital system, which before long must be reformed throughout.

The learned gentleman then strongly insisted on the necessity for a scheme which should insure, on the part of all signalmen, railway engine drivers, officers navigating vessels, and all others employed as look-out men, perfect competency as regarded their visual organs ; and the desirableness of the appointment of an opthalmological teacher at the University. Finally, he hoped the Lunacy Commission, then sitting, would urge the necessity for legislation to relieve the medical profession from undue responsibility in connection with certificates of mental insanity and some other matters, and would indicate means by which the condition of patients and the medical attendants in asylums would be materially improved.

A vote of thanks was then passed to Mr. Rudall for his address and past services, on the motion of Drs. Henry and Neild.

The President then presented, on behalf of the Council, a very finely illuminated address to Dr. Neild, in which they stated their deep sense of obligation to him for his indefatigable and successful efforts in his capacity —during the three last years—as Honorary Secretary, and their desire to place on record the opinion that the present satisfactory position of the Society was mainly due to his zeal and energy.

Dr. Neild, in returning thanks, said he had not expected, nor did he deserve this kind presentation, but he felt it to be an agreeable intimation that the Association was satisfied with the services he had rendered, for which he was very grateful and thanked them sincerely, and, at the same time, he desired to state that it had always afforded him the greatest pleasure to work with the officers of the Society.

The proceedings then terminated.

# NEW SOUTH WALES.

## Geographical Society of Australasia.

### EXPLORATION OF NEW GUINEA.

We have now before us a copy of the instructions laid down by the Geographical Society of Australasia for the guidance of Captain Everill, the leader, and of the other members of the Expedition for the exploration of New Guinea. The Society is making a bold step in thus signalizing its second year. The funds at its disposal are not very great, consisting of some £4000 or £5000 contributed by various Colonial Governments, supplemented by private subscriptions. But the Council seem to have

made the best use of their resources. They have supplied the Expedition with suitable assistance, and have placed at its disposal a specially chosen steam launch and whale boat. The chief object of the Expedition is, of course, to make an addition to the present knowledge of the geographical features of New Guinea. But, besides this, care will be taken to examine into the nature of the fauna, flora, geology, and climate of the island, and the members of the Expedition will be expected to illustrate their discoveries by means of specimens, sketches, photographs, and written descriptions. In order to enable them to fulfil their duties the administrative Council have taken care to forward material of the kind requisite for the preservation of specimens, and they have caused to be printed rules and directions bearing on the subject. On the whole, it will be seen that the Expedition has a great deal of work to do, especially when it is remembered that it must be back again in Sydney by December 8th. We may look for satisfactory results from the undertaking, and all the more because Mr. H. O. Forbes, with an English party, is expected to arrive in New Guinea at almost the same time as Captain Everill, and the two parties will doubtless co-operate. All accounts of the progress of the Expedition will be read with great interest all through Australia, and everybody will be glad to welcome the party home again when their hard work is done.

## QUEENSLAND.

No reports to hand.

## WESTERN AUSTRALIA.

No reports to hand.

## SOUTH AUSTRALIA.

The following article appeared in the *Adelaide Register*, appealing to the South Australian public to establish a branch of the Geological Society of Australasia in South Australia.

"THE GEOLOGICAL SOCIETY OF AUSTRALIA.

"In establishing many Societies there is no end," to adapt an old saying, and it is not surprising that a Geological Society of Australia should have been duly created and organized. That there is abundant scope for the operations of such a body is undeniable. A mass of fragmentary information as to the geology of this continent is available to those who have the time and the patience to search for it, but the number of these is few, and a Society may usefully employ a portion of its energies to the work of classifying and representing in an easy obtainable and reasonably intelligible shape, facts that have already been brought to light. By doing this it will be serving the treble purpose of enlightening those who take an interest in the question, of reducing the risk of geologists themselves wasting time in examining fields that have already been explored, and of promoting a

general and intelligent interest in a fascinating branch of study. The Geological Society of Australia, which has its head-quarters in Melbourne, thus defines the objects it keeps in view—1. The cultivation and advancement of the theory of Geology, more especially as it relates to the Australasian colonies, and the collection of information for the compiling of a reliable Geology of Australasia. 2. The promotion of a Geological Library and Museum; (3) To help geologists to explore unknown parts. These are valuable ends to aim at, and every genuine scientific man must sympathize with the Society in what it is seeking to accomplish. It is clear that to prosper in its undertakings it must be well supplied with funds, and to obtain these it must secure the co-operation of those who love science for its own sake. So far it would seem the parent organization has had no cause to complain of the support accorded it. It is firmly established in Victoria, and it has more or less thriving branches in some of the other colonies. Elsewhere will be found a letter from its Grand Secretary (Mr. R. T. Litton) recommending the Society to the favourable notice of the South Australian public, and advocating the formation of a branch in Adelaide. It is to be hoped that the appeal will be promptly and satisfactorily responded to.* There are men here who have won distinction in the geological field, and upon them must rest the responsibility of taking action. In doing this they will be at liberty to adopt for the branch such a basis as will not be generally inconsistent with the constitution of the parent society. It will be open for them, for instance, to make such proposals as to the formation of a branch Library and Museum in Adelaide as will, without detracting from the completeness of the central collections, be a permanent and attractive source of information to local geologists. It is essential to the success of the scheme that the colonies should co-operate in giving effect to it, and we trust that the appeal now made to South Australia will not be made in vain.

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* GEOLOGICAL SOCIETY OF AUSTRALIA.

TO THE EDITOR.

SIR,—Will you permit me to inform you that a Society has been formed in Melbourne under the title of "The Geological Society of Australasia?" The Society has received much support from almost all of the other colonies, and I would suggest that it is desirable to form a branch of this Association in your city. If half a dozen gentlemen would form a committee, and convene a meeting either by advertisement or circular, I feel confident that a good beginning would be made. Victoria, I feel sure, would gladly welcome the co-operation of South Australia in their efforts to carry out the designs with which this Association was formed. The objects of this Society are:—

1. The cultivation and advancement of the study of Geology, more especially as it relates to the Australasian colonies.
2. The collection of information for the compilation of a reliable Geology of Australasia.
3. For the purpose of founding a Geological Library and Museum.
4. And the Society especially endeavours to promote Geological research in Australasia and in the islands adjacent thereto, and subsidizing Geologists, and by other measures, whenever opportunity arises, for extending Geological knowledge.

I shall have much pleasure in giving any information to gentlemen in your colony, who may feel desirous of forming a South Australian branch. As the Society intends shortly to equip an expedition to geologically explore the northern coast of Australia, we shall require the support as well as the good wishes of all who are interested in this branch of science. I have much pleasure in forwarding a copy of our constitution, which may be of service to you in furthering my wishes.

I am, Sir, etc.,
ROBERT T. LITTON, F.N.S.
Honorary Secretary Geological Society of Australasia.

Melbourne, June 22nd.

## TASMANIA.

No reports to hand.

## NEW ZEALAND.

No reports to hand.

## NOUMEA.

No reports to hand.

## SCIENTIFIC NOTES.

During a recent trip into the interior of Africa, made by Mr. Kerr, amongst other interesting specimens he found in the dry beds of the Zambezi gold dust and quartz, of which he has brought samples with him. The gold dust was obtained after much labour, and it was found that the shingle in which it was found went down an enormous depth. Gold has often been found in this region, but Mr. Kerr's map will be the first published, showing the exact localities. To the north of the Zambezi Mr. Kerr found coal, seemingly of good quality.

An American naturalist, Mr. E. M. Brigham, has announced the discovery of a four-footed bird on the Anabiju River, in the island of Marajo, at the mouth of the Amazon. Curiously enough, the bird is four-footed only in the early part of its life, and after a few days one pair develop into wings. The bird resembles a pheasant.

We learn from the *Glasgow Medical Journal* that scarlet fever broke out among the drinkers of milk from a dairy at Paisley. A child of the dairyman, suffering from scarlet fever, had been kept at home, and subsequently two other children of the same family had become infected; the dairyman and his wife at this period milking the cows and serving out the milk. A prosecution was instituted, and it was brought out in evidence that the dairyman and his wife visited the children—a servant stating that her mistress "attended" them; but, on behalf of the defendants, the children stated that their parents did not "touch" them. The prosecution failed on the point that *contact* was necessary for the purpose of conviction. The order has evidently been drawn by someone who is ignorant of the nature of the infection; and its early amendment in this and other respects is urgently needed in the interests of the public health.

For constructive purposes in dock-yards, piers, bridges, house carpentry, coachmakers' and wheelwrights' work, railway building, fencing, and piles, nearly the whole of the *Myrtaceæ*, of which New South Wales possesses something like fifty varieties, are extremely valuable, and certain of them incomparably so. For the uses of the cabinet maker and the house decorator, the timber familiarly known as the black-apple, the Moreton Bay pine, the red cedar, coach-wood, Clarence light-yellow-wood, turnip-wood,

rose-wood, Illawarra mountain-ash, tulip-wood, myall, cypress-pine, and others, is capable of being worked up into furniture and pannelling, beautiful in grain, rich in colour, and susceptible of a high polish. The timber of the prickly-leaved ti-tree *(Melaleuca styphelioides)* is said to be incapable of decay; that of the white ti-tree *(Melaleuca leucadendron)* is said to be imperishable under-ground; that of the turpentine-tree *(Syncarpia laurifolia)* resists the attacks of the *teredo navalis* in salt water; and that the brush-bastard or white box *(Tristania conferta)* has been known to preserve its soundness, when employed in building the ribs of a ship, for a period of thirty years. To the carver and wood-engraver the cork-wood *(Duboisia myoporoides)*, the rose-wood *(Dysoxylon Fraserum)*, and the pittsporum *(undulatum)* commend themselves as a serviceable substitute for European box; while the cooper finds in the native ash *(Flindersia Australis)*, the silky oak *(Grevillea robusta)*, the stave-wood *(Tarrieta actinodendron)*, the green and silver wattle *(Acacia decurrens* and *Acacia dealbata)*, and the swamp-oak *(Casuarina quadrivalvis)*, excellent material for staves. Other kinds of timber are specially adapted for oars, spokes and naves, tool-handles, telegraph-poles, and turners' work.

Professor Charles E. Bessey has communicated to *The American Naturalist* particulars of some changes that have taken place in the ames flora (Central Iowa) in fifteen years, and as they are observed all over great tracts, and the advance or retreat of some plants has been over distances of 150 miles, they appear to be unconnected with human operations. Fifteen years ago there were no dandelions; for the last half-dozen years they have been plentiful. Then there were no mulleins, now they are plentiful. On the other hand, the flea-bane and one of the dysodias, which were plentiful, have disappeared. Among the grasses, too, there has been a great change. Then there was none of the squirrel-tail grass *(Hordeum jubatum)*, but for the last ten years it has been abundant. Then there was no burr grass; it is now frequently found, and appears to be fast increasing. Both grasses appear to have come in from the west and north-west. The buffalo-grasses of many kinds, which were so abundant, have disappeared, and have retreated 150 miles, but they have been followed up by the "blue-stem" grasses. These also grow in great luxuriance all over great tracts of the plains of Eastern Nebraska, and in Dakota it is the same; the blue stains are marching across the plains, turning what were little better than deserts into grassy prairies.

Why not Eat Insects.—The author tells us in his preface that he is fully conscious of the difficulty of battling against a long-existing and deep-rooted prejudice. We candidly admit that we are prejudiced. From our earliest years we have been taught to regard most of these things, which Mr. Holt avers are so toothsome and nourishing, as unclean. Moreover, we have some doubt as to the wisdom of such a radical disturbance of the balance of Nature as would ensue if Mr. Holt's theories were universally adopted. It seems to us that though man has been given dominion over all creatures, he has also been taught discretion. Modern naturalists teach us the important work done by insects in relation to plant life; it therefore occurs to us that if we were to go to work seriously in capturing certain insects for our food many kinds would disappear altogether. Again, many kinds of the insects named by Mr. Holt as comestibles are already the proper food of various birds and animals which have already a place in our bill of fare. What will happen to these if we deprive them of their natural sustenance? These are some of the reasons why we do not eat insects. Mr. Holt scouts the idea of anyone turning up his nose at the

clean-feeding snail who would nevertheless gulp down an oyster. Now, the snail makes very good food for many of our birds, but there are very few fishes that could render a good account of an oyster. The book is interesting as a literary curiosity, but we think, for many reasons some of which we have indicated above, Mr. Holt will not gain many converts to his new dietary.

Alocassia Sanderiana.—This is a very handsome and truly grand arad, introduced from the Eastern Archipelago, and forming one of the finest of the variegated leaved stove plants yet introduced into Europe. On the young leaves the colour is bright glossy green, and on the older leaves the surface has a metallic blue reflection. The leaf blade is arrow shaped, the front portion with about three triangular lobes on each side, the basal portion with one or two smaller lobes. The thick costa and the stout cross veins are white, conspicuously bordered with ivory white, the margins also being white. This is one of the most beautiful of all the alocassias, and a most magnificent foliage plant. It was recently shown at the great Whitsun Horticultural Exhibition at Manchester, and awarded a first class certificate of merit.

Young standard fruit trees—apples, for instance—are often sadly neglected. The long, straight shoots of hundreds of them are neither shortened at the time of planting nor afterwards. The result of that great error is that a few shoots push from towards the extremities, while the lower portions, to the extent often of eighteen inches or more, are practically destitute of growths, and the first crop the trees bear drags down the branches, and they never get up again. Such trees are practically spoiled, or, at least, they are manifestly inferior to others of the same age that have been pruned, and the subsequent growth intelligently pinched during the first few years after planting. We would rather shorten the young shoots now with tufts of growth near their tips, that are to be found on trees planted last autumn or this spring. Then leave them as they are, on the principle of choosing the lesser of two evils; and young trees that have been properly pruned, and the young growths pinched back systematically, will have presently main branches so strong that they would bear heavy weights without bending down. Such trees will be in a condition to bear more fruit than the untended trees can possibly do, and they are immeasurably superior, having regard to their future career and productiveness. They will be strong, well formed, and studded with spurs, and will need but comparatively little pruning afterwards.

We have just received Part V. of "The Forest Flora of South Australia," by J. E. Brown, F.L.S., Conservator of Forests for the Government of South Australia. The plates, which are seventeen inches by thirteen inches, are chromo-lithographed by E. Spillar, Government printer, of Adelaide, and in addition to flowering and fruiting branchlets show sections of flower, fruit and stem. This number contains two plates of *Eucalyptus gracilis*, popularly called mallee, one of white the other of the red barked variety: *Myoporum insulare*, the "blue-berry tree," sometimes called the "native currant tree," "native myrtle," or "native juniper;" *Melaleuca squarrosa*, the "bottle brush tea tree," and *Pittosporum phillyræoides*, the "poison berry tree." Very valuable for botanists not living in Australia are the notes in the descriptive letterpress which Mr. Brown makes of the faithfulness of the chromo-lithographs, as without some such criticism the value of the plates could be but surmised. Thus the orange tinge of the "white mallee" at the first glance raises the question, why is not this called the yellow mallee? The bark is certainly represented greyish-white,

but with regard to the branchlet Mr. Brown says:—"Perhaps, to be very critical, we might object in a small degree to the rather high orange colour which pervades the picture. The grounds for this objection are somewhat more imaginary than real, as the young wood and flowering buds of the particular mallee are generally of a bright orange colour, as depicted by the artist." It would be useful if all botanists followed Mr. Brown's example in such notes. The letterpress gives in each case a "popular description" of each plant, so that the work is of interest to a wider circle than that of scientific botanists alone. The work aims at being popular, and the "botanic description" is in each case printed in small type at the end of the general description. Under the "bottle bush tea tree" is given a brief historical notice of the discovery by Captain Cook's men of its use as an anti-scorbutic. There are "salt water" and "fresh water" tea trees, and the bushmen know by them what quality of water abounds in the districts.

"SNAIL FARMS" have been introduced in Switzerland, where many gardens round Davos and Landguart, in the Grisons, are used for the sole cultivation of that Continental delicacy, "Escargots de Bourgogne." Children gather the snails off the hedges in summer and place them on bushes in the farms. There they are fed on refuse vegetable leaves, and surrounded by a thick barrier of sawdust, which prevents their escape. When the cold weather comes the snails, grown fat, bury themselves in the sawdust to begin their long winter sleep, but they are soon collected and sent off to Italy to be sold for 14s. and 16s. the basket of 2 cwt.



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